ON THE PRESENT STATUS OF THE OPERATION OF GASTRO-ENTEROSTOMY.[1]

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THE mortality of gastro-enterostomy has steadily declined from 60 or 70 per cent. until now it stands between 15 and 30 per cent., as given in the majority of statistics. This high death-rate for so comparatively simple an operation is somewhat complex in analysis; but two causes, which are to a considerable extent capable of elimination, seem to be visible in nearly all of the bad results, and modifications of the original operation have been and still are being brought forward to correct them. One of these causes has to do with the ever-present but unforseeable possibility of occlusion of the alimentary tract at or near the point of anastomosis, and the other, which follows the first almost as a corollary, is dependent upon the condition of the patient. Only those who are beyond hope of recovery are, as a rule, deemed ready for so serious an operation. The chance that uncontrollable vomiting may occur in any case operated in the usual way, and lead to a miserable death, is well understood by the medical attendant, and is more or less feared by the surgeon, and many sufferers from entirely relievable distress are allowed to reach such a stage of exhaustion that any interference is rather a means of providing euthanasia than therapeutics. Hence, any method of operating which has given a mortality almost as low in benign cases, as the interval operation for appendicitis, should be carefully considered, for there seems to be such a method; and it is the more worthy of emphasis as, judging from a rather careful study of the literature, it seems to have received little general recognition. If the medical man or general practitioner is once convinced, as now seems possible, that gastro-enterostomy or, preferably, gastro-duodenostomy has been deprived of most of its earlier terrors, there will follow a great advance in the treatment of many benign though disabling and sometimes dangerous disorders of the stomach.

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The causes of death as described in their usual order of frequency are shock, collapse, asthenia, or inanition, all practically the same when one bears in mind the extreme debility of the patients usually considered to require so (statistically) serious an interference. The operation too often has been one of last resort. Then come infection and peritonitis with pneumonia a close third. Pneumonia might be classified with asthenia as apt to occur after any abdominal operation upon asthenic subjects, especially after the deep narcotization so frequently necessary to obtain relaxation in epigastric wounds. It has been variously ascribed as due to inhalation of stomach contents,—though with proper care this ought not to happen,—to the difficulty of coughing in the presence of an abdominal injury, and to hypostatic congestion. In the majority of instances, however, it seems as unavoidable as the causes of death which stand first in frequency.

Infection, to be sure, should be escaped, and with the improvement in technique of intestinal operations has very much decreased. But here again the asthenia of the subject, usually considered ready to require a gastro-enterostomy, is largely responsible. Absolute asepsis is practically unattainable at present in any form of operation which has to do with the interior of the alimentary tract. The perfectly healthy peritoneum can take care of a great deal of sepsis, but the damaged abdomen of a weakly person is quite another thing. Nevertheless, there is still room for improvement as regards infection.

The fourth most common cause of death, and in some statistics and in the minds of many surgeons it ranks much higher, is obstruction in one form or another. " Vicious circle" vomiting, as it is aptly designated, caused a fatal ending in the second gastro-enterostomy on record, and the numerous methods brought forward to escape it can justly be regarded as directly or indirectly the underlying cause of much of the other mortality. All but two, or at most three, of the methods which have been employed are " loop" operations,—that is, a loop of jejunum (or ileum) has been united to the front or back of the stomach and carried in front of the colon or behind it through the transverse mesocolon. The vicious circle vomiting when it occurred was then the result of escape of stomach contents into the proximal instead of the distal leg. The distal leg is mechanically occluded by the displacement of its lumen from the opening in the stomach. There may also be a physiological factor in the process, as Chlumski has shown by animal experimentation that filling of the duodenum inhibits the peristalsis of the stomach. The attempts to avoid this accident by giving the loop some particular position in relation to its mesentery, or its legs, or the stomach, or the colon, or by making an entero-anastomosis, led to too prolonged operations, with their numerous dangers and the consequent use of mechanical appliances to save time,—and to many infections, and to intestinal obstruction by volvulus of the loop or by hernia and strangulation over it of the gut lower down. But experience with the loop operations demonstrated the necessity of making the fistula as near the greater curvature of the stomach as possible, and also the value of entero-anastomosis as the base of the legs of the loop. Aside from the risks of a long operation and the maximum danger of infection by opening the alimentary tract in three places, there need then (after entero-anastomosis) be no reasonable expectation of " vicious" vomiting. If it occurs, it is an unavoidable accident inherent in all the loop operations.

Another result of these experiences has been the survival of the Murphy button against all mechanical competitors. One surgeon of very large experience, who always uses the loop, told me that before he employed this contrivance he often had serious vomiting, sometimes followed by death; but since he began to employ the button, in some fifty or sixty cases, he has had none of this trouble. In general, this seems to agree with other reports. The accidents usual with the button have sometimes happened, but dangerous or fatal vomiting is at least rare, apparently because the button, by nearly filling the lumen of the gut, is a hindrance to sharp kinking or spur formation. Of the other methods not involving any loop, the first to be mentioned is gastro-duodenostomy. The union of the stomach with the descending duodenum, introduced by Billroth for restoring continuity after pylorectomy and improved by Kocher, had been utilized in certain cases of benign stenosis by Henle and then by Villard, but lately has been advanced by Finney as a substitute for all gastrojejunostomies. In the Finney operation its prototype, the old Heinecke-Mikulicz plan of pyloroplasty, is amplified by transposing the transverse anterior division of the pylorus into a horseshoe-shaped ∩ incision, six to ten inches long, through the under part of the pylorus and adjoining greater curvature of the stomach and descending portion of the duodenum. The opening is thus large, in the lower part of the stomach, and provides free drainage. It is anatomicallly and physiologically correct, and, when circumstances permit, the few written reports and the many verbal ones I have heard seem to favor it without qualification. But gastrojejunostomy is undoubtedly a necessity for the greater number of cases.

Roux's method "en Y" attempts to solve the difficulty of the loop by section of the gut at the summit with implantation of the distal end into the stomach, and of the proximal end into the intestine below, but the numerous unpleasant possibilities, the chief of which are the time it requires and the increased risk of infection, have not made it popular. The other operation, which does not involve the use of any loop, is the one to which I wish to call attention. It is that described by Petersen as used in Czerny's clinic. He reports 215 gastrojejunostomies. with only a 5 per cent. mortality from all causes in benign cases, and among these there was not a single instance of serious vomiting and no obstruction. It is based on the simple anatomical principle that the first few inches of the jejunum lie directly in contact with the posterior surface of the stomach, separated from it only by the non-vascular portion of the mesocolon, and that this part of the jejunum descends vertically and without any turns. To perform the operation, after opening the abdomen by a median four-inch incision just above the umbilicus, the position of the greater curvature is noted. The transverse colon and omentum are turned up on the thorax, and the posterior surface of the stomach is exposed by tearing through a portion of the mesocolon, which is free from vessels. An area about two inches square is thus exposed, and attached at its margin by four Lembert stitches to the edges of the rent. The plica duodenojejunalis is then felt for and seen, and, while the gut is held up perpendicularly to the spine, it is attached from two to four inches below its origin, by a row of Lembert sutures placed transversely to the long axis of the gut around one-half the circumference of its free border to the opposite exposed posterior stomach wall. The ends of the first and last stitches are left long as guides. In front of this the stomach and gut are opened, and the cut edges sutured or a Murphy button is inserted. The long guide and end stitches behind are then used as starting-points for another row of Lembert stitches to close off the fistula. The omentum and transverse colon are replaced and the abdomen closed. The jejunum is thus anastomosed in its normal position, and without any twists, to the adjoining posterior stomach wall. There is no loop to become occluded, and no chance for volvulus or hernia above it. In Czerny's clinic the Murphy button, supplemented by a ring of Lembert sutures outside, has generally been employed. Mikulicz (after Socin) advises an opening on the free border of the gut, transverse to its long axis and suture only. But the button is quicker and, if properly reinforced by suture externally, leaves little to be desired. Liquid nourishment can be administered as soon as the effects of the ether have passed off. Retention of the button in the stomach, in spite of the numerous instances of its harmlessness (in one case it was retained nearly seven years) may be avoided by the use of Hildebrand's or Weir's modification of the instrument. But there is no absolute guarantee that even this will not fail, as I know of one case* in which such a button (apparently inserted by Dr. Weir himself) was retained in the stomach, and gave rise to symptoms enough to require another operation for its removal. And in this connection it is worthy of note that a retained button is reported as the cause of death in at least one patient from hæmatemesis. The autopsy showed the button embedded in an ulcer of the stomach with an open vessel under it.

A line of sutures externally to reinforce the button has also proved fatal by too much narrowing of the lumen of the gut; but this is perfectly avoidable, and such an error should not count too much against the additional security, although reinforcing sutures evidently favor retention of the button in the stomach by narrowing the lumen of the gut through which it must pass to escape properly. The following cases, which were operated upon at the St. Francis Hospital, serve well to illustrate this Czerny-Petersen method.

Case I.—M. H., thirty-two years old, laborer, has had dyspepsia for the past two years, which during the last six months has grown much worse. Lately there has been vomiting. Pain in the abdomen is constant, especially after taking food. There has been a very marked loss of flesh and strength, and also a troublesome cough with some dyspnœa on exertion.

Physical examination revealed consolidation of the left apex and many tubercle bacilli in the sputum, with a tumor in the epigastrium about the size of an orange. As the patient was in such distress from the pain and vomiting, operation was performed on July 27, 1903. A median three-inch incision just above the umbilicus revealed a pyloric tumor and a much dilated stomach. The tumor had all the gross appearance of carcinoma. There were no adhesions, and, with the exception of a few enlarged lymph nodes in the immediate neighborhood, there were no metastases. This was an excellent case for removal, but the general condition forbade any more than the briefest interference. A retrocolica posterior gastrojejunostomy was therefore accomplished, with the aid of a Murphy button reinforced by suture, within three inches of the beginning of the jejunum. After stitching the exposed posterior stomach wall to the edges of the opening made in the mesocolon, the jejunum was drawn taut, so that the portion between the plica duodenojejunalis and that in the grasp of the assistant's fingers formed a straight line perpendicular to the spine. The point selected for the fistula was one slightly above that where, in the position of the parts noted in first opening the abdomen, the greater curvature crossed the beginning of the jejunum. Thus the latter, when the stomach and intestine were replaced, descended vertically downward from the plica to its first turn below the fistula.

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* Personal communication from Dr. J. A. Blake.

Recovery was uneventful. There was no vomiting and no pain, and liquid feeding was begun that night, owing to the extreme asthenia. The patient was out of bed at the end of two weeks, and left the hospital shortly afterwards without having passed the button. No change was noted in the tumor, which seems to confirm the belief in its malignancy.

I have since heard that death followed at home sometime in November from phthisis, without the return of vomiting or abdominal pain. The relief of vomiting was expected, but the disappearance of the pain impressed me greatly. The operation would offer a reasonable hope of relieving much of the suffering of gastric carcinoma, even when unaccompanied by pyloric obstruction.

Case II.—A. D., fifty years old, female servant, was received in the medical service with a history of pain in the region of the stomach, increased after taking food, and of vomiting. Of late the vomiting had become more frequent, and there had been some loss of flesh. Physical examination revealed a rather feeble and prematurely old-looking woman, with marked epigastric tenderness on pressure just to the left of the median line. No tumor was perceptible. After three weeks of medical treatment without improvement, and with a diagnosis of gastric ulcer, operation was performed on August 18. A median four-inch incision, having the last inch below the umbilicus, revealed a somewhat dilated and thin-walled stomach. No other gross abnormality was noted. A retrocolica posterior anastomosis was carried out as before with the Murphy button. The fistula was placed about three and one-half inches below the plica duodenojejunalis. Liquid feeding was begun the following day. There was no vomiting and no complaint of pain, and the patient seemed well on the way to recovery, but about a week later a bad cystitis developed from catheterization. This was followed by uræmia, and death on August 31. Autopsy demonstrated that the anastomosis was perfect, though the button had fallen into the stomach. The latter showed a chronically inflamed mucosa, and had become more or less contracted and funnel shaped, with the fistula at the apex of the cone. No ulcer nor its cicatrix was discovered. The cause of death was a suppurative cystitis and pyelonephritis. The other organs were normal.

This was a case of bad chronic gastritis with dilatation, and the constant distress with the loss of flesh and strength and the inability to work seemed to justify interference. Medical treatment had failed to give any relief to the symptoms, but after the gastrojejunostomy these entirely disappeared.

CASE III.—M. P., forty-five years old, housewife, was sent to the hospital with a diagnosis of gastric ulcer or carcinoma. There was a history of epigastric pain, increased by taking food, and occasional vomiting, in which there had been some blood. During the past six months she had lost forty pounds in weight. There seemed to be a small tumor in the region of the stomach, and an absence of free hydrochloric acid was noted. While under observation and medical treatment no improvement took place, and therefore on September 26 an exploration was undertaken.

After the abdomen was opened by a median four-inch incision just above the umbilicus, the liver was found to be cirrhotic; but, as the stomach showed a slightly thickened and congested area anteriorly near the pylorus and the gastric symptoms had been severe, gastrojejunostomy was deemed proper, and this was accomplished by the Czerny-Petersen method as in the previous cases, but without the button. The gut was opened transversely around its free border to an extent equal to half its circumference and at a point about three inches below the plica.

Recovery was uneventful. Liquid feeding was begun the next day, and all symptoms disappeared, and the patient left the hospital at the end of three weeks, professing to be relieved, but without any noticeable gain in weight.

I have since heard that there has been some return of her stomach trouble, and believe this may be due to the cicatricial contraction of the fistula. At any rate, there was no difficulty until the contraction might have taken place. Mayo has called attention, in cases somewhat like this, to the need of artificially narrowing a perfectly patent pylorus to prevent subsequent obliteration of the new fistulous opening. This history, by the way, is not meant to suggest gastrojejunostomy as a routine treatment for the stomach complications of hepatic cirrhosis. It was employed here to relieve a very probable gastric ulcer, which, to be sure, could not be verified, as the interior of the stomach was not explored. The immediate success was marked, and I think the explanation of the recurrence of symptoms reasonable.

Case IV.—A. R., twenty-eight years old, housewife, was admitted to the medical service in June with a typical history of gastric ulcer, including hæmatemesis, and while under treatment developed an abscess appendicitis, for which I operated in July. After this had healed, as the gastric distress and vomiting persisted to such an extent that almost no food could be retained and the woman seemed starving to death, I performed a gastrojejunostomy by the Czerny-Petersen method with the Murphy button, as the patient could evidently stand only the briefest interference. The fistula was placed about three inches below the end of the duodenum. The button was reinforced by a continuous suture externally.

Recovery was uneventful. Liquid feeding was begun that night, and from then on all complaints ceased. There was no more pain and no vomiting, and there was a very noticeable gain in the general health. At first this was quite rapid, but later the improvement was more gradual, and seemed the slow gain from a long and severe illness. She left the hospital in good condition, although there was some dyspepsia towards the latter part of the time she was under observation.

In this case I believe again, as in Case III, that in the presence of a perfectly patent pylorus the new fistula underwent cicatricial contraction, and its benefit was at least diminished. The primary improvement and the subsequent cessation of improvement are certainly suggestive.

CASE V.—A. H., fifty years old, mechanic, had a Heinecke-Mikulicz pyloroplasty for benign stenosis performed by me on December 29, 1902. During the next six months he gained nearly thirty pounds in weight, and then in July, 1903, the former symptoms began to recur. These grew gradually worse, and therefore on October 5, 1903, I made a gastrojejunostomy by the Czerny-Petersen method, placing the anastomotic opening, which was accomplished with sutures, about three and one-half inches below the duodenum. The condition of the pylorus in this operation was interesting. At the completion of the last operation, nine months previously, the index-finger, invaginating before it the anterior wall of the stomach, could easily be passed into the duodenum. Now the pylorus was found practically closed, surrounded by adhesions and high up under the liver.

Recovery was uneventful, and on the eleventh day afterwards I found the patient at work in his shop. All symptoms have been completely relieved, except that he tells me he has to be a little more careful of his diet than formerly. Fermentable foods are apt to cause dyspepsia, but otherwise he is as well as ever. In the months immediately following the first operation he could eat anything, whereas now sugars, starches, and cabbage are not so easily disposed of. This history would seem to indicate, as might be supposed, that gastroduodenostomy is preferable to gastrojejunostomy.

In these five cases there was one death three weeks after operation from an ascending infection of the urinary tract. But in none of them was there anything but satisfaction in the entire relief of symptoms. As they represented respectively cancer, dilated or atonic stomach, ulcer, chronic gastritis (and ulcer?) with hepatic cirrhosis, and benign stenosis of the pylorus, they can be said to be examples of successful treatment of nearly all kinds of chronic gastric disorder. And certain enthusiasts have extolled the operation as a panacea in this class of diseases. It is, however, undeniably excellent for benign and malignant stenosis of the pylorus, and for ulcer and atonic dilatation of the stomach. Gastroduodenostomy is physiologically better when possible, and should be given the preference. But when the retrocolica posterior anastomosis is impracticable, an anterocolica anterior loop operation combined with entero-anastomosis may have to be undertaken. There are now a considerable number of observations on record of the late results of gastro-enterostomy for benign disease, especially for ulcer. One of the first and most frequent bad results is contraction of the fistula and recurrence of the symptoms. To prevent this, Mayo recommends a purse-string suture about the pylorus. A plication by infolding of the anterior stomachic wall at this point would be simpler, and ought to be equally effective. At any rate, in the presence of a patent pylorus some method of artificial occlusion is necessary to obtain permanence of results. A retention of the Murphy button can generally be avoided by using Weir's or Hildebrand's instrument, although the assurance as noted above is not very strong. In the presence of hyperacidity, diarrhœa for a longer or shorter time, generally a week or so, may be expected. Peptic ulcers in the jejunum have several times been observed, and some of these have caused death by perforation or hæmorrhage. But as a general thing the motility of the stomach has been vastly improved. Some bile can be always detected in the stomach contents, but never seems to have caused unpleasant symptoms. The development of a sphincteric action in the fistula is questionable, and a matter of more academic than practical interest. There has often apparently been found an impaired digestion for fats, and consequently an excess of such articles of diet is to be avoided. But as a result of my own rather limited experience and from what I can gather from others, a gastro-enterostomy as described above is a most satisfactory operation, and one which sooner or later is certain to come into much more general use than formerly for chronic benign gastric disease. It is already universally accepted for pyloric obstruction, but not as early in the course of the obstruction as it should be. For dilated and atonic stomachs it is undoubtedly preferable to medication. Little can be expected in the way of restoration of the secreting power of the mucous membrane in such a condition, and the drainage is better by gastrojejunostomy than by gastroduodenostomy. For ulcer, with its dangers from hæmorrhage and perforation, gastroduodenostomy where possible should be the choice. But adhesions which may be present around the pylorus ought to negative the prolonged operation usually necessary to mobilize the parts for accomplishing a proper stomach-duodenum fistula. A simple pyloroplasty too often has failed, and an opening four or five inches in vertical diameter is only possible when the parts are freely movable.

The permanency of any artificial opening and its desirability in the presence of a patent pylorus is of course an ever-present problem. Contraction seems inevitable. The Finney operation escapes it as much as any wound can, and that, in the absence of adverse reports, is an unanswerable argument in its favor. But when this method is impracticable, as it so often is, should the pylorus be artificially closed to insure permanency in the jejunal fistula? Will the fistula not remain open until the conditions for which it is made are cured and then close, leaving everything as it should be? Apparently not. The fistula will close in the majority of instances, at least before a permanent cure is obtained. And therefore it seems necessary to close the pylorus, as only under such conditions has experience shown that the new opening will remain patent. A peptic ulcer of the jejunum is about the worst which can be expected, and with a gastroduodenostomy a similar ulcer in the duodenum is at least equally probable. Gastrojejunostomy, however, as shown in Case V, may involve some minor dyspeptic symptoms. The ulcers, though rare, are serious possibilities inherent in both methods, and the dyspepsia seems slight; therefore, when gastroduodenostomy is impracticable, gastrojejunostomy with closure of the pylorus is far preferable to leaving a patient to suffer from a far worse condition than an occasional discomfort.

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